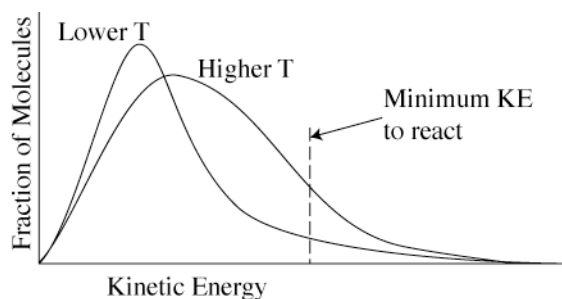




7. The rate constant for the hydrolysis of sucrose, a first order reaction, is  $0.21 \text{ hr}^{-1}$ . How long will it take for a 2.5 M solution to hydrolyze until there is only a 0.10 M solution of sucrose?
8. Explain what a mechanism for a reaction is. What is each step in the mechanism called? What is the rate law for each step? What do you look for to see if a mechanism is consistent with the reaction?
9. Explain reaction rate dependence on temperature using this diagram.



10. How does a catalyst lower the activation energy of a reaction?
11. Show the Q setup for the following reactions:  
 $6 \text{ CO}_2(\text{g}) + 6 \text{ H}_2\text{O}(\text{g}) \rightleftharpoons \text{C}_6\text{H}_{12}\text{O}_6(\text{s}) + 6 \text{ O}_2(\text{g})$   
 $\text{C}_2\text{H}_6(\text{g}) + 7/2 \text{ O}_2(\text{g}) \rightleftharpoons 2 \text{ CO}_2(\text{g}) + 3 \text{ H}_2\text{O}(\text{g})$
12. Which way does a reaction go if  $Q > K$ ,  $Q < K$ , or  $Q = K$ ?
13. For the reaction:  $2\text{A}(\text{g}) + \text{B}(\text{g}) \rightleftharpoons 2\text{C}(\text{g}) \quad \Delta H = +100 \text{ kJ/mol}$   
 a) Which way does the reaction go on increasing pressure? Why?  
 b) Which way does the reaction go on increasing volume? Why?  
 c) Which way does the reaction go on increasing temperature? Why?
14. For the reaction in #13, at equilibrium, if  $[\text{A}] = 0.012\text{M}$ , and  $[\text{B}] = 0.025\text{M}$ , and  $[\text{c}] = 0.015\text{M}$ , what is the value of K?
15. For the reaction in #13, if  $[\text{A}] = 0.040\text{M}$ , and  $[\text{B}] = 0.030\text{M}$ , and  $[\text{c}] = 0.030\text{M}$ , would the reaction need to go to the right or left to reach equilibrium? Show how the concentrations would be expressed algebraically to solve what the concentrations would be at equilibrium.